allegedly being uapatentable over Bastle in view of U.S. Patent No. 4,713,639 to Grunert et al., hereinafter "Grunert." Claims 7, 15, and 22 stand rejected under 35 U.S.C. § 103(a) as allegedly being uapatentable over Bastle in view of U.S. Patent No. 4,062,052 to Harper et al., hereinafter "Harper."

Applicant respectfully traverses the grounds for rejection and requests reconsideration and withdrawal of the rejections of claims 1-23 in view of the amendments and the following remarks.

***Drawing Objection***

The examiner has objected to the drawings under 35 C.F.R. § 1.83(a) for allegedly not showing every feature of the invention as recited by the claims. In particular, the examiner has noted the spacer and the mechanism.

The figures as originally filed, show every feature of the invention and therefore, meet the requirements of 35 C.F.R. § 1.83(a). Regarding the spacer, frame 28 serves as a spacer (application as originally filed at page 5, line 5). The spacer is shown in Figure 1, embodied as frame 28. Regarding the mechanism, it is shown in Figure 1, embodied as changeover valve 30.

Accordingly, applicant respectfully requests reconsideration and withdrawal of the drawing objections under 35 C.F.R. § 1.83(a).

***35 U.S.C. § 112, Second Paragraph, Rejection***

Regarding claims 1, 8, 16, and 23, the examiner requests clarification of how the last activation point is determined. The phrase "force required to activate the mechanism varies between a minimum force and a maximum force in relation to the time since the mechanism was last activated" describes the fact the force required to operate a mechanism may vary due to a phenomenon known as "stiction" (application as originally filed at page 2, line 35 to page 3, line 12 and page 6, line 36 to page 7, line 11). That is, a recently operated valve may activate with a low force while a valve that has not been recently activated (and may be internally corroding) may need a

larger force to activate due to "stiction". When activation timing is critical (e.g., hydraulically controlled circuit breakers), even a small amount of "stiction" may cause a conventional solenoid to activate the mechanism later than desired. Thus, the phrase "time since the mechanism was last activated" simply refers to the last time the mechanism was activated. Determining the last activation point is not required - the mechanism activates with a consistent activation time regardless of when the last activation point occurred.

Regarding claim 1, the examiner requests clarification of applying electrical current to the armature. Amended claim 1 recites that the electrical current is applied to the solenoid rather than the armature.

Regarding claims 4 and 12, the examiner requests clarification of separating the end of the armature from the mechanism. The amended claims recite that the armature is spaced apart from the mechanism such that the armature does not contact the mechanism in the first position. This feature is clearly seen in Figure 2, wherein, in the first position, extension member 26 is spaced apart from and does not contact the face of valve element 32 (application as originally filed at page 5, lines 4-7).

Regarding claims 7 and 15, the examiner requests clarification of how the mass delays the armature. As shown in Figure 2, the weight of the mass (body 40) exerts a downward gravitational force on armature 20, thereby delaying movement of armature 20 (application as originally filed at page 7, lines 18-26). The mass may be continually attached to the armature.

Regarding claim 13, the examiner requests clarification of the extension member. As seen in Figure 1, extension member 26 is attached to armature 20 via rod 22 (application as originally filed at page 4, line 28 to page 5, line 2). Extension member 26 includes a shoulder 27 for receiving a spring.

In view of the foregoing, reconsideration and withdrawal of the rejection of claims 1-23 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

***35 U.S.C. § 102 and 103 Rejections***

Independent claims 1, 8, 16, and 23, as amended, include features that are neither disclosed nor suggested by the cited references, either taken alone or in combination, namely as represented by amended claim 8:

8. (Amended) A solenoid assembly, for use in activating a mechanism, wherein a force required to activate said mechanism varies between a minimum force and a maximum force in relation to the time since said mechanism was last activated, said solenoid assembly comprising:

a solenoid having an armature extending therefrom, wherein said armature moves between a first position and a second position, wherein when an electrical current is applied to said solenoid, said solenoid causes said armature to exert an armature force; and

a *delay member for delaying the movement of said armature*, wherein after the initiation of an electrical current to said solenoid said delay member delays the movement of said armature from said first position to said second position *until such time as said armature exhibits an armature force greater than said maximum force necessary to activate said mechanism.* (emphasis added)

The invention is directed to a solenoid assembly for activating a mechanism such that mechanism activation times are consistent. The solenoid assembly includes a solenoid having an armature and a delay member. The delay member provides a delay force that delays the movement of the armature from a first position to a second position until the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism. As shown in Figure 3, delaying the movement of the armature allows the current and the armature force to build up enough to activate the mechanism regardless of the amount of "stiction." In this manner, consistent mechanism activation times are achieved because when the mechanism moves, the force is great enough to activate even a sticky mechanism.

Bastle does not disclose or suggest a *delay member* that ***delays the motion of the armature*** with a delay force to delay the movement of the armature from the first position to the second position *until the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism.* In fact, Bastle employs a lost motion connection that allows almost ***immediate armature movement***. (Bastle at Figures 1 and 2). As shown in Figure 2 of Bastle, armature 32 almost immediately moves into coil 24. Only after armature 32 has completed its travel,

does valve 18 begin to move (Bastle at Figure 3 and 4). This immediate armature motion allows armature 32 to enter into coil 24, which generates an increased armature force (due to increase magnetic flux linkage from the physical position of the armture, not due to increased current), such that valve 18 may be unseated. Therefore, Bastle does not structurally anticipate the invention as recited by the claims. Further, any reference that is combined with Bastle to delay armature motion would be improper because there is no technological motivation for the modification and the intended function of Bastle would be destroyed (the immediate armature movement of Bastle is critical to allowing the armature to enter into the coil and thereby allow the flux linkage to increase). *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Moreover, such lost motion connections do not yield consistent actuation times. Therefore, Bastle does not render the invention as recited by the claims as obvious.

Regarding method claim 1, the examiner states that the method steps would be inherent in the product structure. However, Bastle does not *delay* armature movement; rather, Bastle allows almost *immediate* armature movement. Therfore, the method steps are not inherently disclosed in Bastle, in fact, Bastle discloses just the opposite.

Accordingly, applicant submits that Bastle does not disclose or suggest all of the features of independent claims 1, 8, 16, or 23. Moreover, no other references can be combined with Bastle to provide a delay of armature motion because such delay would destroy the intended function of Bastle. Therefore, applicant respectfully submits that claim 1, 8, 16, and 23 and all claims dependant therefrom, including claims 2-7, 9-15, 17-22 are patentable over the cited references. According, applicant respectfully requests reconsideration and withdrawal of the rejections of claims 1-23 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a).

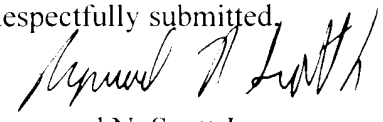
## CONCLUSION

For all the foregoing reasons, applicant respectfully submits that the present application is now in condition for allowance. Reconsideration of the office action and an early notice of

allowance are respectfully requested. In the event that the examiner cannot allow the present application for any reason, the examiner is encouraged to contact the undersigned attorney, Raymond N. Scott Jr. at (215) 564-8951, to discuss resolution of any remaining issues.

Attached hereto is a marked-up version of the changes made to the application by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Respectfully submitted,



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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

***In The Claims:***

Claims 1, 2, 4, 8, 9, 12, 16, 17, 19, and 23 have been amended as follows.

1. (Amended) A method of activating a mechanism, wherein a force required to activate the mechanism varies between a minimum force and a maximum force in relation to the time since the mechanism was last activated, the method comprising:

applying an electrical current to a solenoid having an armature extending therefrom, wherein the armature is movable between a first position and a second position and wherein the electrical current of the solenoid causes the armature to exert an armature force; and

delaying, after applying the electrical current to the solenoid [armature], the movement of the armature from the first position to the second position until such time as the armature force is greater than the maximum force necessary to activate the mechanism.

2. (Amended) The method as recited in claim 1, wherein delaying comprises:

delaying, after applying the electrical current to the solenoid [armature], the movement of the armature from the first position to the second position until such time as the armature force exhibits a preselected armature force that is greater than or equal to the maximum force necessary to activate the mechanism.

4. (Amended) The method as recited in claim 1, further comprising separating the end of the armature apart from the mechanism such that the armature does not contact the mechanism in the first position, prior to applying the electrical current.

8. (Amended) A solenoid assembly, for use in activating a mechanism, wherein a force

required to activate said mechanism varies between a minimum force and a maximum force in relation to the time since said mechanism was last activated, said solenoid assembly comprising:

a solenoid having an armature extending therefrom, wherein said armature moves between a first position and a second position, wherein when an electrical current is applied to said solenoid, said solenoid causes said armature to exert an armature force; and

a delay member for delaying the movement of said armature, wherein after the initiation of an electrical current to said solenoid [armature] said delay member delays the movement of said armature from said first position to said second position until such time as said armature exhibits an armature force greater than said maximum force necessary to activate said mechanism.

9. (Amended) The solenoid assembly of claim 8, wherein said delay member comprises a spring positioned to bias said armature against movement from said first position to said second position.

12. (Amended) The solenoid assembly of claim 9 further comprising a spacer positioned between said solenoid and a mechanism requiring mechanical movement, so that when said armature is in said first position the end of said armature is spaced apart from and does not contact said mechanism.

16. (Amended) A solenoid assembly, for use in activating a mechanism wherein a force required to activate said mechanism varies in relation to the time since said mechanism was last activated, said solenoid assembly comprising:

a solenoid having an armature extending therethrough, wherein said armature moves between a first position and an second position wherein when an electrical current is applied to said solenoid, said solenoid causes said armature to exert an armature force; and

a delay member for delaying the movement of said armature, wherein after the initiation of

an electrical current to said solenoid [armature] said delay member delays the movement of said armature from said first position to said second position until said armature exhibits a preselected armature force, necessary to activate said mechanism.

17. (Amended) The solenoid assembly of claim 16, wherein said armature comprises a shoulder and wherein said delay member comprises a spring [is] positioned to exert force against said shoulder.

19. (Amended) The solenoid assembly of claim 16, wherein said solenoid assembly is adapted for use with a mechanism requiring mechanical movement, said solenoid assembly further comprising a spacer, positioned between said solenoid and said mechanism, so that when said armature is in said first position the end of said armature is spaced apart from and does not contact said mechanism.

23. (Amended) A solenoid assembly for use in activating a mechanism, wherein a force required to activate said mechanism varies between a minimum force and a maximum force in relation to the time since said mechanism was last activated, said solenoid assembly comprising:

a solenoid having an armature extending therefrom, wherein said armature moves between a first position and a second position, wherein when an electrical current is applied to said solenoid said solenoid causes said armature to exert an armature force;

a spring biasing said armature against movement from said first position to said second position, said spring having a spring constant sufficient to delay armature motion until such time as said armature exhibits an armature force greater than said maximum force necessary to activate said mechanism; and

a spacer, positioned between said solenoid and said mechanism, so that when said armature is in said first position the end of said armature is spaced from said mechanism.